VERIFICATION OF TRANSLATION

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declare as follows:

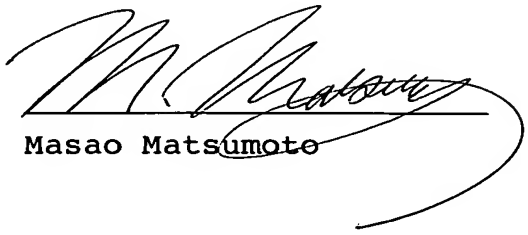
1. That I am well acquainted with both the English and Japanese languages, and

2. That the attached document is a true and correct translation made by me to the best of my knowledge and belief of:-

   The specification accompanying the Application No. 10-330364 for a patent made in Japan

   filed on November 20, 1998.

February 5, 2004



Masao Matsumoto

PATENT OFFICE

JAPANESE GOVERNMENT

This is to certify that the annexed is a true copy of the following application as filed with this Office.

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Application Number : Patent Application No. 330364/Heisei 10

Applicant(s) : NEC Shizuoka, Ltd.

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Commissioner, Takeshi Isayama
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[IPC CLASSIFICATION] H04B 7/26

[TITLE OF INVENTION] SYSTEM AND METHOD FOR SENSING CARRIER ON MOBILE STATION SIDE IN PERSONAL HANDYPHONE SYSTEM

[THE NUMBER OF CLAIMS] 9

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[THE NAME OF DOCUMENT] SPECIFICATION

[TITLE OF THE INVENTION] SYSTEM AND METHOD FOR SENSING CARRIER ON MOBILE STATION SIDE IN PERSONAL HANDYPHONE SYSTEM

[CLAIM]

[CLAIM 1] A personal handyphone system performing radio connection using a time division multiple access-time division duplex system comprising

a base station which performs carrier sensing of a communication frequency intended to be used and a reception slot, and designates the communication frequency and the communication slot for a mobile station by using a control frequency when the communication frequency and the reception slot are unused,

a mobile station which performs carrier sensing the communication frequency and the reception slot designated by said base station, and initiates communication when non use is judged in both carrier sensing,

characterised in that said mobile station has means for performing carrier sensing not only for a reception slot of said mobile station but also a transmission slot, upon carrier sensing in response to designation of the communication frequency and the slot by a base station.

[CLAIM 2] A personal handyphone system as set forth in claim 1,

in carrier sensing in said mobile station, setting of reception electric field level as judgment condition of non use is provided individually for said reception

slot and said transmission slot.

[CLAIM 3] A personal handyphone system as set forth in claim 1, wherein said mobile station further comprises

setting means for modifying and setting said reception electric field level as non use judgment condition in carrier sensing,

said setting means setting said reception electric field level as non use judgment condition at an appropriate value corresponding to a reception electric field level of a control frequency and a control slot from said case station.

[CLAIM 4] A carrier sensing method on a mobile station side of a personal handyphone system performing radio connection using a time division multiple access-time division duplex system comprising a base station which performs carrier sensing of a communication frequency intended to be used and a reception slot, and designates the communication frequency and the communication slot for a mobile station by using a control frequency when the communication frequency and the reception slot are unused, a mobile station which performs carrier sensing the communication frequency and the reception slot designated by said base station, and initiates communication when non use is judged in both carrier sensing,

characterised in that in said mobile station, performing carrier sensing not only for a reception slot

of said mobile station but also a transmission slot, upon carrier sensing in response to designation of the communication frequency and the slot by a base station.

[CLAIM 5] A carrier sensing method on a mobile station side of a personal handyphone system as set forth in claim 4,

in carrier sensing in said mobile station, setting of reception electric field level as judgment condition of non use is provided individually for said reception slot and said transmission slot.

[CLAIM 6] A carrier sensing method on a mobile station side of a personal handyphone system as set forth in claim 4, wherein said mobile station further comprises

modifying and setting said reception electric field level as non use judgment condition in carrier sensing,

in said modifying and setting step, setting said reception electric field level as non use judgment condition at an appropriate value corresponding to a reception electric field level of a control frequency and a control slot from said case station.

[CLAIM 7] A mobile station of a personal handyphone system performing radio connection using a time division multiple access-time division duplex system which performs carrier sensing the communication frequency and the reception slot designated by said base station, and initiates communication when non use is judged in both carrier sensing, comprising

means for performing carrier sensing not only for a

reception slot of said mobile station but also a transmission slot simultaneously, upon carrier sensing in response to designation of the communication frequency and the slot by a base station.

[CLAIM 8] A mobile station as set forth in claim 7, further comprising

means for setting given level for carrier sensing as non use judgment condition in carrier sensing as variable.

[CLAIM 9] A mobile station as set forth in claim 7,

when the reception electric field level of the communication and slot assignment signal received from said base station through the down-link control slot is in excess of a predetermined reference value, the given level for carrier sensing is set at the predetermined reference value, when the reception electric field level of the communication and slot assignment signal becomes lower than the predetermined reference value, the given level for carrier sensing is set at the reception electric field level of the communication and slot assignment signal received from the base station through the down-link control slot.

[DETAILED DESCRIPTION OF THE INVENTION]

[0001]

[RELEVANT TECHNICAL FIELD TO THE INVENTION]

The present invention relates generally to a system and a method for sensing a carrier of a mobile station in

a personal handyphone system (PHS). More particularly, the invention relates to a system and a method for sensing a carrier in a self-supporting system, in which asynchronous Time Division Multiple Access (TDMA) system is present in admixing manner.

[0002]

[PRIOR ART]

Conventionally, in a radio communication system according to a TDMA system, upon performing radio communication between a plurality of base stations and mobile stations using the same frequency, carrier sensing is performed in each station in order to check whether a radio wave is transmitted from other station before initiation of communication, in order to avoid interference between a radio wave of own station and a radio wave from other station. As a result of carrier sensing, if the radio wave from other station is not detected, communication is initiated.

[0003]

In case of a personal handyphone system (PHS), a base station performs carrier sensing of communication frequency and slot intended to be used. If the radio wave from other station is not detected in the communication frequency and slot intended to be used, judgment is made that the communication and slot in question are not used to designate those communication frequency and slot for the mobile station using a control

frequency and slot. The mobile station performs carrier sensing of the communication frequency and communication slot designated by the base station. Then, if the radio wave from other station is not detected, communication is initiated.

[0004]

In the first edition of standard specification relating to the personal handyphone system RCR STD-28 (established on December 20, 1993), a function to only perform establishment of slot intended for reception and a fixed reception electric field level is defined as carrier sensing level, concerning carrier sensing system of the communication slot of the base station and the mobile station.

[0005]

Fig. 9 is a flow diagram showing the conventional state transition upon connection of the communication channel of the mobile station. Fig. 6 is a sequence chart showing a communication channel connection sequence between the mobile station and the base station. In ON-hook state of the mobile station, a communication channel (CH) and slot assignment demand signal 61 (see Fig. 6) is transmitted to the base station (step 80 shown in Fig. 9). Then, the base station performs carrier sensing at the communication frequency and the communication slot intended to be used. If no radio wave from other station is detected in the communication frequency and the slot

intended to be used, judgment is made that those communication frequency and slot are not used to perform designation of the communication frequency and the communication slot for the mobile station. Upon reception of the communication channel (CH) ands slot assignment signal 62, the mobile station performs carrier sensing operation for a reception slot having the designated communication frequency and slot (steps 82 and 84 shown in Fig. 9). When an electric field level is higher than or equal to a given level, the communication channel assignment demand signal is transmitted to the base station (step 83 shown in Fig. 9). If the communication frequency and slot are not used (the electric field level is less than the given level), for the base station, a synchronization signal 63 (see Fig. 6) is transmitted using the designated communication frequency and communication slot (step 85 shown in Fig. 9) to wait for the synchronization signal. After reception of the synchronization signal 64 (see Fig. 6) from the base station, state is transit to communication state.

[0006]

One example of carrier sensing operation in the conventional mobile station will be discussed briefly. Referring to Fig. 3, since a mobile station (A) 34 performs carrier sensing operation for only reception slot of a designated communication frequency, on-going

communication between a base station (B) 31 and a mobile station (B) 35 cannot be detected. Thus, communication between the mobile station (A) 34 and a base station (A) 30 is initiated at the same frequency as the communication frequency of on-going communication between the base station (B) 31 and the mobile station (B) 35. Therefore, since the communication frequency in on-going communication between the base station (A) 30 and the mobile station (A) 34 and the communication frequency of communication between the base station (B) 31 and the mobile station (B) 35 are the same, if the mobile station (B) 35 is moved to approach the mobile station (A) 34, radio interference is caused due to superimposition of the transmission slot in communication in the mobile station (B) 35 on a reception slot in communication in the mobile station (A) 34.

[0007]

[PROBLEMS TO BE SOLVED BY THE INVENTION]

As set forth above, in the carrier sensing system of the conventional personal handyphone system (PHS), carrier sensing level of only reception slot intended to be used is performed in own base station and own mobile station for initiating communication. Therefore, immediately after initiation of communication, there is low possibility to cause radio interference from other mobile station. Accordingly, actually, the transmission slot of the own mobile station has already been used by

other mobile station. In the case where judgment is made that no carrier is present upon carrier sensing of the reception slot of the own base station, when other mobile station moves to approach to the own mobile station after initiation of communication, or when the own mobile station moves to approach other station, radio interference is inherently caused.

[0008]

On the other hand, since the carrier sensing level upon carrier sensing of the mobile station is constant irrespective of the reception level of the control signal from the own base station, even when the interference wave higher than or equal to the reception electric field level of the control signal from the own base station is detected upon carrier sensing, judgment is made that the slot is not used to initiate communication. In this case, radio interference is caused immediately after initiation of communication.

[0009]

Therefore, an object of the present invention is to provide a method and a system which can solve the above-described conventional shortcomings and is capable of sensing carrier for preventing radio interference in communication state of the personal handyphone system.

[0010]

[MEANS TO SOLVE THE PROBLEM]

A mobile station of a personal handyphone system

according to the present invention has means for performing carrier sensing not only for a reception slot of the mobile station but also a transmission slot simultaneously, upon carrier sensing in response to designation of a communication frequency and a slot by a base station. In addition, in the shown mode for carrying out the present invention, in carrier sensing in the mobile station, there is a construction to have a function to make the carrier sensing level variable instead of fixing.

[0011]

[MODE FOR CARRYING OUT THE INVENTION]

A mode for carrying out the present invention will be discussed. In the shown mode for carrying out the present invention, a mobile station of a personal handyphone system has means for performing carrier sensing not only for a reception slot of the mobile station but also a transmission slot simultaneously, upon carrier sensing in response to designation of a communication frequency and a slot by a base station.

[0012]

On the other hand, in the shown mode for carrying out the present invention, in carrier sensing in the mobile station, there is a construction to have a function to make the carrier sensing level variable instead of fixing.

[0013]

Carrier sensing is performed not only for reception slot but also for transmission slot upon carrier sensing for preventing the own mobile station from using of the communication carrier which has already been used by other mobile station located near the own mobile station.

[0014]

[WORKING EXAMPLE]

The preferred working example of the present invention will be discussed with reference to the drawings. Fig. 2 is a block diagram showing a construction of a mobile station of one working example of a personal handyphone system according to the present invention. Referring to Fig. 2, one embodiment of the mobile station according to the present invention includes an antenna portion 21, a transmitting portion 22, a base band processing portion 23, a control portion 24, a user interface portion 25, a receiving portion 26, a transmission slot carrier sensing circuit 27 and a reception slot carrier sensing circuit 28. Amongst, the transmission carrier sensing circuit 27 is an element constituting the feature of one embodiment of the present invention, and known elements may be used for other elements.

[0015]

Fig. 3 is an illustration for explaining one example of the present invention and showing a system construction of the personal handyphone system.

Referring to Fig. 3, while the base station (B) 31 and the mobile station (B) 35 are in communication, the mobile station (A) 34 is about initiation of communication with the base station (A) 30. Since the mobile station (A) 34 is located within a service area of the base station (B) 31, the radio wave of the base station (B) 31 can be received by the mobile station (A) 34, whereas the mobile station (A) 34 cannot receive the radio wave from the mobile station (B) 35.

[0016]

Fig. 4 is an illustration showing a slot construction in the personal handyphone system according to TDMA (Time Division Multiple Access-TDD (Time Division Duplex). As shown in Fig. 4, during a period of 5 msec. four transmission slots (T1 to T4) and four reception slots (R1 to R4) are arranged to constantly use the fourth slot after used transmission slot as the reception slot. Thus, the transmission slot and the reception slot use the same radio frequency.

[0017]

Furthermore, referring to Fig. 4, each slot is consisted of a lamp bit portion 41, a preamble portion 42, a synchronization word portion 43, a base station number portion 44, a mobile station number portion 45, an information channel portion 46 and a guard bit portion 47.

[0018]

Fig. 1 is an illustration showing one example of

the slot construction for explaining one embodiment of the present invention. By application of the carrier sensing system according to the present invention, it becomes possible to successfully prevent occurrence of radio interference. As one example of a relationship between the time slots of the base station (A) 30 and the base station (B) 31 (see Fig. 3), a relationship between the time slot during communication of the base station (B) 31 and the mobile station (B) 35 and the time slot with which the base station (A) 30 and the mobile station (A) 34 are about initiation of communication.

[0019]

Referring to Fig. 1, while the base station (B) is in communication, the transmission slot (T3) 17 overlaps with the transmission slot 15 intended to be used for transmission, with which the mobile station (A) 31 is about initiation of communication. The frequency and slot with which the mobile station (A) 34 is about initiation of communication, are designated by the base station 30. However, in the base station (A) 30, as a result of carrier sensing of the reception slot 14 intended to be used for communication, the frequency and slot already used in communication between the base station (B) 31 and the mobile station (B) 35, are designated as the communication frequency and the communication slot since the base station (A) 30 cannot receive the radio wave of the transmission slot 17 in

communication of the mobile station (B) 31.

[0020]

Fig. 6 is a chart showing a communication channel connection sequence in one example of the present invention. On the other hand, Fig. 7 is a flow diagram showing state transition of the communication channel connection of the mobile station in one example of the present invention. Operation of the mobile station (A) 34 will be discussed hereinafter with reference to Figs. 1, 3, 6 and 7.

[0021]

By OFF-hook operation of the mobile station (A) 34, the mobile station (A) 34 transmits a communication channel (CH) assignment demand signal 61 to with an up-link controlling slot 13 (step 70 shown in Fig. 7) and becomes a reception waiting state of the communication channel (CH) and slot assignment signal (step 71 shown in Fig. 7).

[0022]

In the base station (A) 30, when the communication CH and slot assignment demand signal 61 from the mobile station (A) 31 is received, carrier sensing operation of the reception slot of the arbitrary communication frequency is performed. As a result of carrier sensing, if judgment is made that the communication frequency is not used, the communication CH and slot assignment signal 62 is transmitted to the mobile station (A) 34 with a

down-link control slot 10 to designate the communication frequency and the communication slot.

[0023]

In the example shown in Fig. 1, the third slot is taken as the communication slot and the communication frequency used for communication between the base station (B) 31 and the mobile station (B) 35 is taken as communication frequency.

[0024]

In the mobile station (A) 34, when the communication CH and slot assignment signal 62 is received from the base station (A) 30, carrier sensing operation of the designated communication frequency and the communication slot is performed (step 72 shown in Fig. 7). In the example of Fig. 1, the mobile station (A) 34 performs carrier sensing operation of the reception slot 12 of the third slot as the designated communication slot and the transmission slot 15 of the third slot are performed by respective of the reception slow carrier sensing circuit 28 and the transmission slot carrier sensing circuit 27.

[0025]

Fig. 5 is an illustration for explaining the carrier sensing point in the mobile station (A) 34. In the mobile station (A) 34, the slot designated by the base station (A) 30 performs measurement of the reception electric field at three points of the front end 51,

center 52 and rear end 53 of the slot as carrier sensing points.

[0026]

In the mobile station (A) 34, the carrier sensing operation of the reception slot 12 and the transmission slot 15 is performed by the reception slot carrier sensing circuit 28 and the transmission slot carrier sensing circuit 27. Upon carrier sensing of the transmission slot 15, it becomes possible to receive the down-link slot transmitted from the base station (B) 31 during communication. Then, the reception electric field level becomes higher than or equal to the given level to make judgment that the relevant slot of the relevant radio frequency is in use (step 74 shown in Fig. 7). Again, the communication CH assignment demand signal is transmitted with the up-link control slot 13 (step 73 shown in Fig. 7).

[0027]

Receiving the communication CH assignment demand signal from the mobile station (A) 34, the base station (A) 30 performs the carrier sensing operation again (step 72 shown in Fig. 7) to assign the communication frequency different from the precedingly designated communication frequency to the mobile station (A) 34.

[0028]

The mobile station (A) 34 receives the communication CH and slot assignment signal from the base

station (A) 30 to perform the carrier sensing operation again to check whether the communication frequency and slot are used or not. Then, the mobile station (A) 34 transmits the synchronization signal 63 to the base station (A) 30 using the communication frequency and the transmission slot for communication and becomes a waiting state for waiting synchronization signal (step 76 shown in Fig. 7).

[0029]

The mobile station (A) 34 becomes communication state after verification of reception of the reception signal 64 with the communication reception slot in the communication frequency.

[0030]

In the foregoing operation, since the communication frequency in communication of the base station (A) 30 and the mobile station (A) 34 and the communication frequency of the base station (B) 31 and the mobile station (B) 35 are different, radio interference will never be caused even when the mobile station (B) 35 is moved close to the mobile station (A) 34 after initiation of communication.

[0031]

Here, carrier sensing operation in the conventional mobile station will be discussed with reference to Figs. 1, 3 and 9 as comparative example. In order to perform carrier sensing operation of only reception slot 12 of the communication frequency designated from the base

station (A) 30, the mobile station (A) 34 cannot detect communication between the base station (B) 31 and the mobile station (B) 35. Thus, the mobile station (A) 34 and the base station (A) 30 initiate communication at the communication frequency the same as the communication frequency between the base station (B) 31 and the mobile station (B) 35 in communication. Therefore, communication between the base station (A) 30 and the mobile station (A) 34 is performed at the communication frequency the same as the communication frequency between the base station (B) 31 and the mobile station (B) 35 to cause overlapping of the reception slot 12 of the mobile station (A) 34 in communication with the transmission slot 18 of the mobile station (B) 35 in communication when the mobile station (B) 35 moves close to the mobile station (A) 34 to cause radio interference.

[0032]

Next, other examples of the present invention will be discussed. Fig. 8 is a flow diagram for explaining a judgment method of the carrier sensing result in the second embodiment of the present invention. Referring to Figs. 1, 3, 6, 7 and 8, the operation of the mobile station (A) 34 in the second example of the present invention will be discussed hereinafter.

[0033]

By OFF-hook operation of the mobile station (A) 34 (step 70 shown in Fig. 7), the communication CH

assignment demand signal 61 (see Fig. 6) is transmitted to the base station (A) 30 by the up-link control slot 13 (see Fig. 1).

[0034]

Then, the mobile station (A) 34 becomes waiting state for waiting the communication CH and slot assignment signal (step 71 shown in Fig. 7).

[0035]

The base station (A) 30 is responsive to the communication CH and slot assignment demand signal 61 from the mobile station (A) 34 to perform carrier sensing of the reception slot at the arbitrary communication frequency. When the reception slot for which carrier sensing is effected, is judged as not being used, the communication frequency and the communication slot are designated for the mobile station (A) 34 by the down-link control slot 10 (see Fig. 1) by the communication CH and slot assignment signal 62 (see Fig. 6).

[0036]

The mobile station (A) 34 stores the reception electric field level of the communication CH and slot assignment signal 62 (see Fig. 6) received through the down-link control slot (see Fig. 1) from the base station (A) 30 (step 90 shown in Fig. 8).

[0037]

The mobile station (A) 34 performs carrier sensing operation of the communication frequency and the

communication slot designated by the base station (A) 30 (step 72 shown in Fig. 7).

[0038]

Fig. 5 shows a carrier sensing point of the mobile station (A) 34. The mobile station (A) 34 takes the slot designated by the base station (A) 30 as a carrier sensing objective slot 50. As the carrier sensing point, electric field measurement at three points of the front end 51, the center 52 and the rear end 53 of the slot, is performed.

[0039]

The mobile station (A) 34 is set the reception electric field value of a judgment reference of the carrier sensing result normally at 26 dBuV according to the first edition of standard specification RCR STD-28 (established on December 20, 1993). When the reception electric field level of the communication CH and slot assignment signal 62 received from the base station (A) 30 through the down-link control slot 10 is in excess of 26 dBuV, the given level for carrier sensing is set at 26 dBuV (step 92 shown in Fig. 8).

[0040]

When the reception electric field level of the communication CH and slot assignment signal 62 received from the base station (A) 30 through the down-link control slot 10 becomes lower than 26 dBuV, the given level for carrier sensing is set at the reception

electric field level of the communication CH and slot assignment signal 62 received from the base station (A) 30 through the down-link control slot 10.

[0041]

By the foregoing control, when an interference wave higher than the reception electric field value of the control signal received through the down-link control slot 10 of the base station (A) 30 is present, even if the electric field level of the interference wave is lower than or equal to 26 dBuV defined by the first edition of the standard specification RCR STD-28 (established on December 20, 1993), occurrence of radio interference can be successfully prevented by detecting high possibility of occurrence of radio interference upon entry into communication state at the same frequency.

[0042]

[THE EFFECT OF THE INVENTION]

As set forth above, by the carrier sensing system of the personal handyphone system according to the present invention, when the transmission slot of the own mobile station has already been used by other mobile station or when other mobile station moves close to the own mobile station or the own mobile station moves close to other mobile station after initiation of communication in the own mobile station, radio interference can be prevented successfully.

[0043]

Furthermore, according to the present invention, by making the defined value for carrier sensing judgment variable, initiation of communication at the communication frequency possibly cause radio interference can be successfully prevented before initiation of communication.

[BRIEF DESCRIPTION OF THE DRAWINGS]

[Fig. 1]

Fig. 1 is an illustration showing a slot construction in the case of occurrence of radio interference in one embodiment of a personal handyphone system according to the present invention;

[Fig. 2]

Fig. 2 is a block diagram showing a construction of one embodiment of a mobile station according to the present invention;

[Fig. 3]

Fig. 3 is an illustration showing a system construction of the case where radio interference is caused in the personal handyphone system;

[Fig. 4]

Fig. 4 is an illustration showing the slot construction of the personal handyphone system;

[Fig. 5]

Fig. 5 is an illustration showing a carrier sensing point in the personal handyphone system;

[Fig. 6]

Fig. 6 is an illustration showing a communication channel connection sequence of the personal handyphone system;

[Fig. 7]

Fig. 7 is an illustration showing a communication channel connection sequence of one embodiment of the mobile station according to the present invention;

[Fig. 8]

Fig. 8 is an illustration showing a carrier sensing result judgment method of one embodiment of the mobile station according to the present invention; and

[Fig. 9]

Fig. 9 is an illustration showing a communication channel connection sequence of the conventional mobile station.

[THE DESCRIPTION OF THE NUMERALS]

10 down-link control slot of own base station (A)

11 down-link communication slot intended to be used of own base station (A)

12 down-link communication slot intended to be used of own mobile station (A)

13 up-link control slot of own base station (A)

14 up-link communication slot intended to be used of own base station (A)

15 up-link communication slot intended to be used of own mobile station (A)

16 up-link communication slot in communication of

other base station (B)

17 down-link communication slot in communication of other base station (B)

18 up-link communication slot in communication of other mobile station (B)

19 down-link communication slot in communication of other mobile station (B)

20 mobile station of this invention

21 antenna portion

22 transmitting portion

23 base band processing portion

24 control portion

25 user interface portion

26 receiving portion

27 transmission slot carrier sensing circuit

28 reception slot carrier sensing circuit

30 own base station (A)

31 other base station (B)

32 service area of own base station (A)

33 service area of other base station (B)

34 own mobile station (A)

35 other mobile station (B)

41 lamp bit portion

42 preamble portion

43 synchronization word portion

44 base station number portion

45 mobile station number portion

46 information channel portion

47 guard bit portion

50 carrier sensing objective slot

51 front end of carrier sensing point

52 center of carrier sensing point

53 rear end of carrier sensing point

54 carrier sensing slot (reception)

55 carrier sensing slot (transmission)

60 OFF-hook operation of the mobile station

61 communication channel (CH) assignment demand signal

62 communication CH and slot assignment signal

63 up-link synchronization signal

64 down-link synchronization signal

[THE NAME OF DOCUMENT] ABSTRACT

[ABSTRACT]

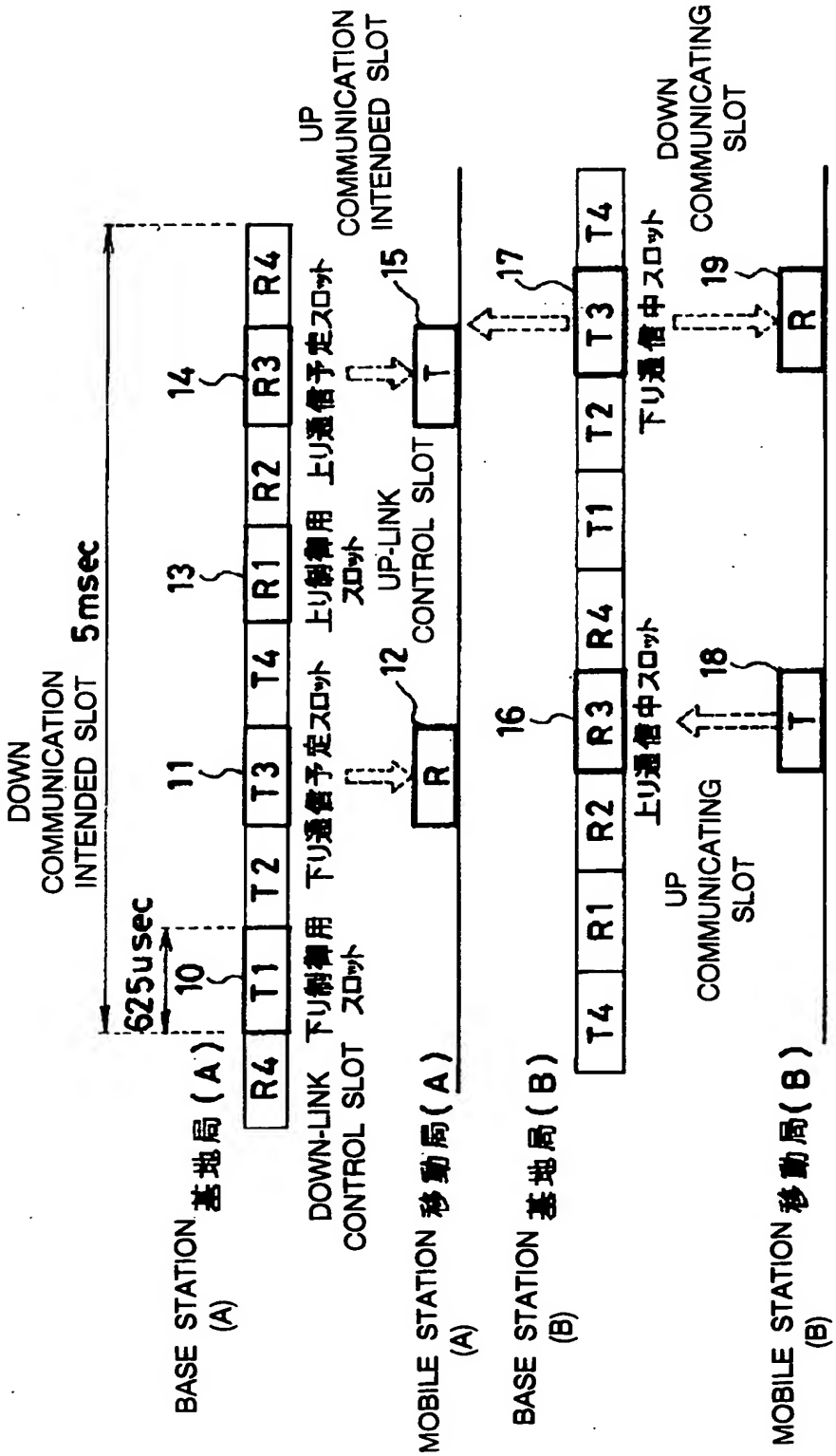
[OBJECT] It is an object of the present invention to provide a method and a system for sensing carrier for preventing radio interference in communication state.

[CONSTITUTION] This system has means for performing carrier sensing not only for a reception slot of the mobile station but also a transmission slot simultaneously, upon carrier sensing in response to designation of a communication frequency and a slot by a base station, and means for making the carrier sensing level variable instead of fixing. Carrier sensing is performed not only for reception slot but also for transmission slot upon carrier sensing.

[SELECTED DRAWING] Fig.1

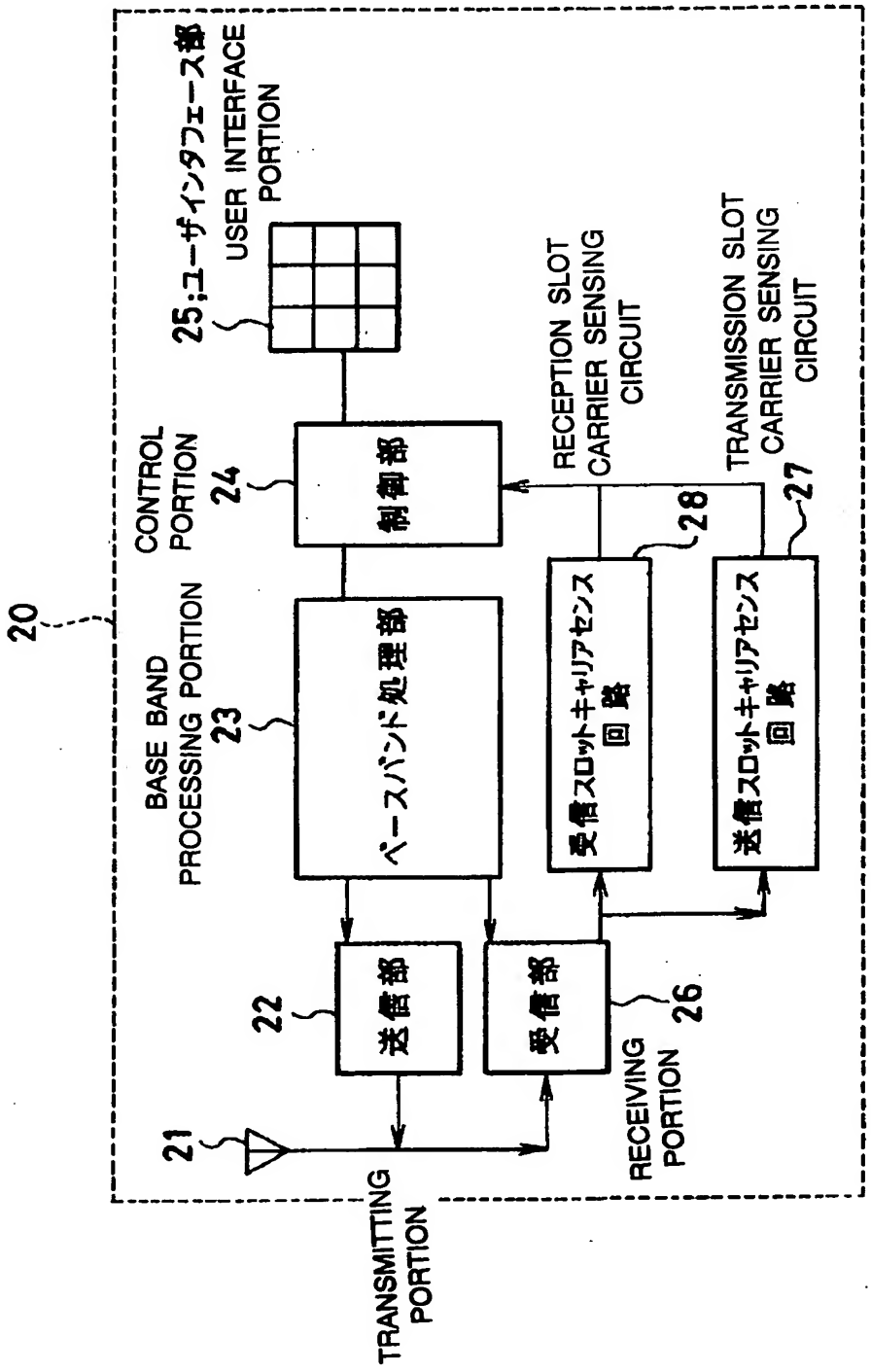
【書類名】　　図面

【図１】 FIG. 1



【図２】

FIG. 2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制御部
BASE BAND PROCESSING PORTION
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28
受信スロットキャリアセンス回路
TRANSMISSION SLOT CARRIER SENSING CIRCUIT
27
送信スロットキャリアセンス回路
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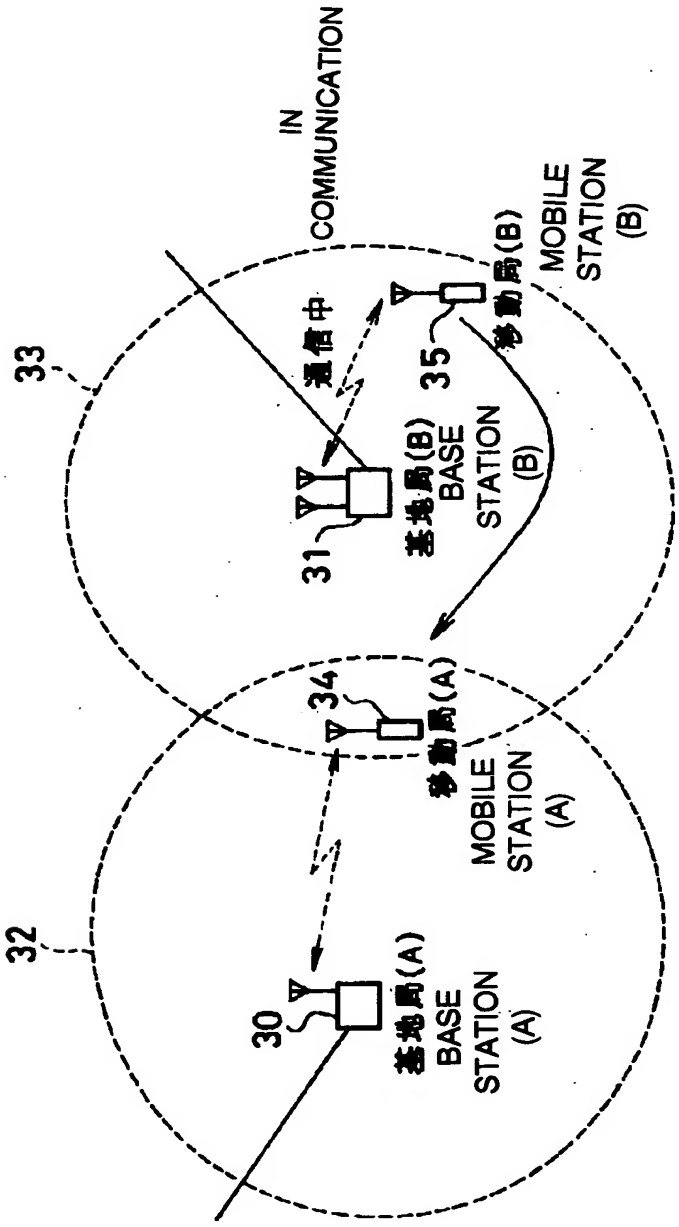
送信部
26
受信部
RECEIVING PORTION
21
TRANSMITTING PORTION

【図３】

FIG. 3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通信中
移動局(B) MOBILE STATION (B)
基地局(B) BASE STATION (B)
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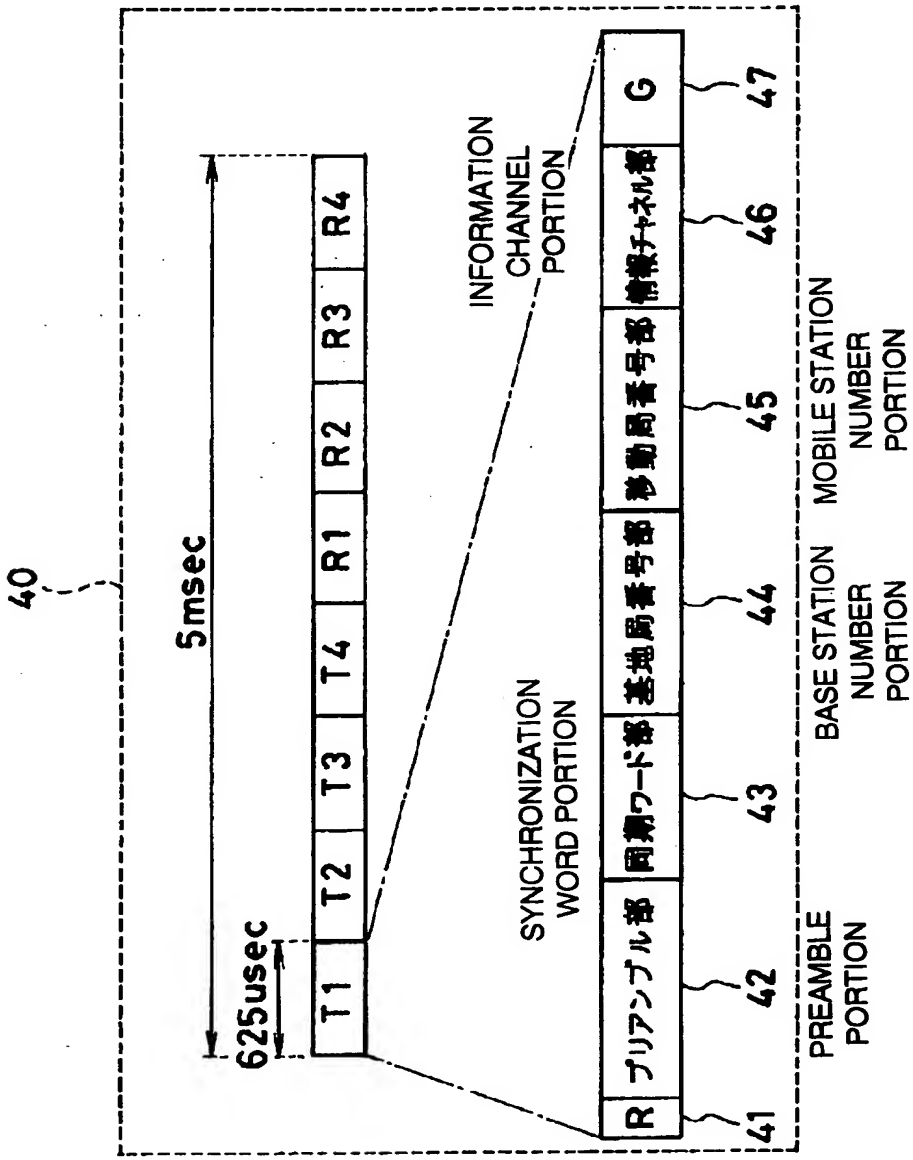
31
32
33
34
35

【図４】

FIG. 4


40
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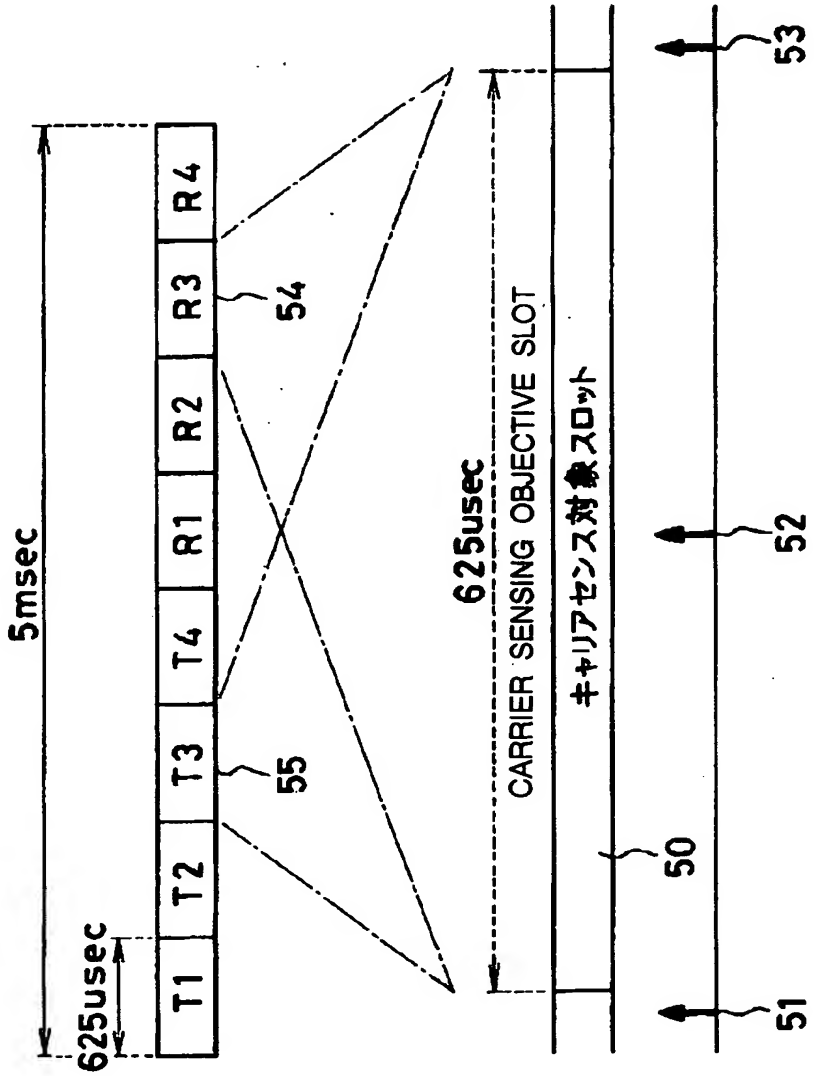
625usec
T1
T2
T3
T4
R1
R2
R3
R4
INFORMATION CHANNEL PORTION
SYNCHRONIZATION WORD PORTION
R
プリアンブル部
同期ワード部
基地局番号部
移動局番号部
情報チャネル部
G
41
42
43
44
45
46
47
PREAMBLE PORTION
BASE STATION NUMBER PORTION
MOBILE STATION NUMBER PORTION

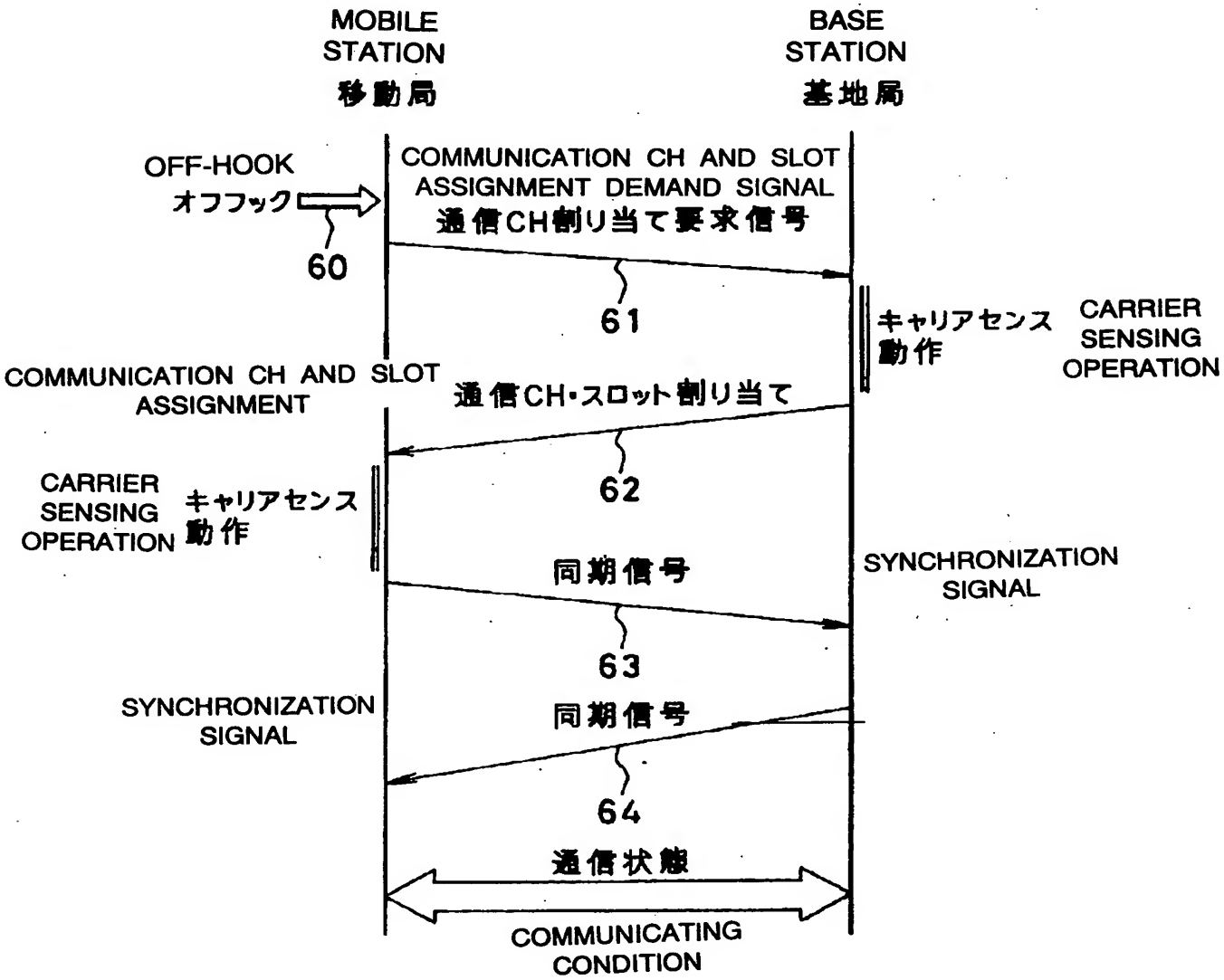
【図５】

FIG. 5


5msec
625usec
T1
T2
T3
T4
R1
R2
R3
R4
54
55
625usec
CARRIER SENSING OBJECTIVE SLOT
キャリアセンス対象スロット
50
51
52
53

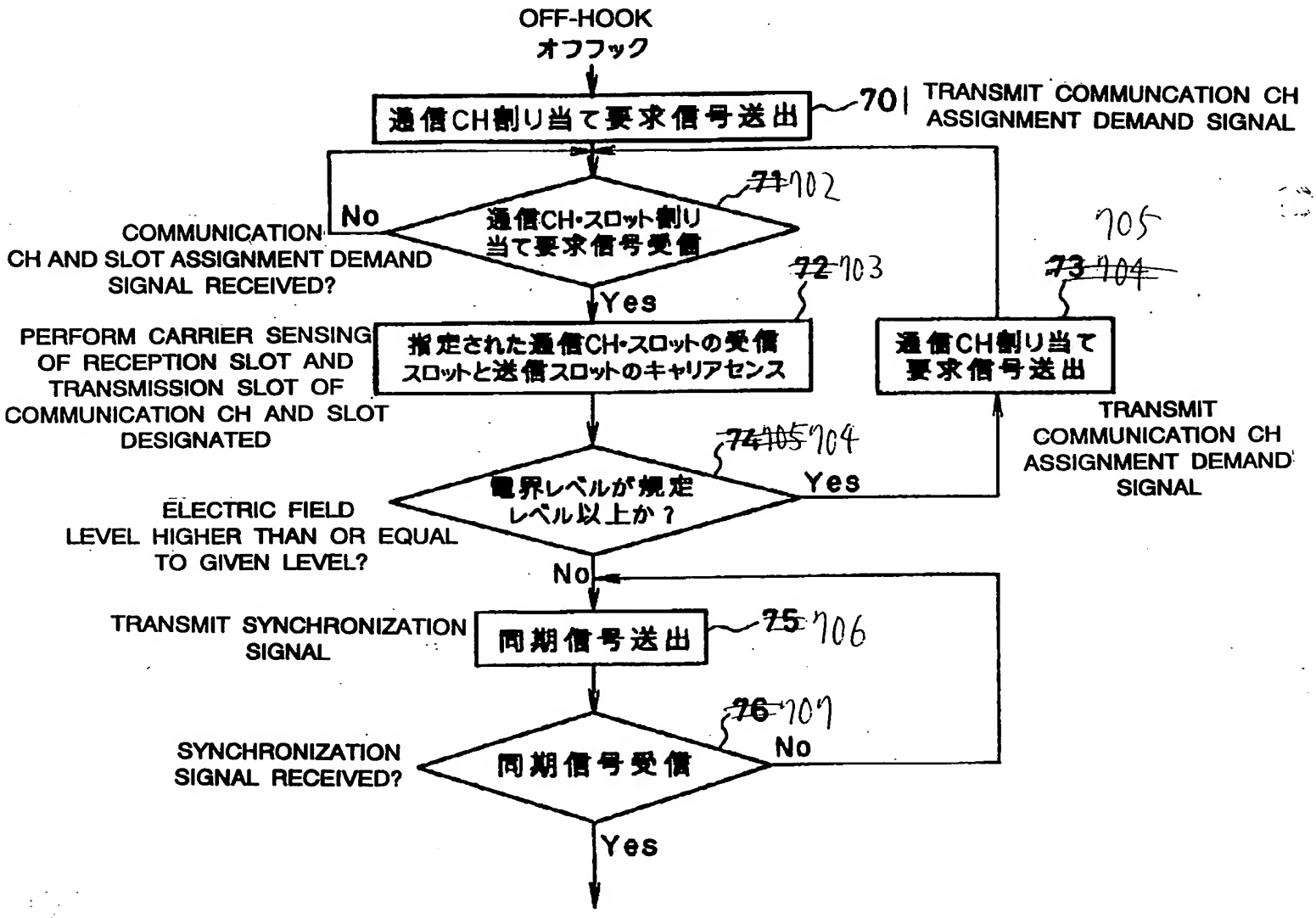
【図６】

FIG. 6


MOBILE STATION
移動局
BASE STATION
基地局
OFF-HOOK
オフフック
60
COMMUNICATION CH AND SLOT ASSIGNMENT DEMAND SIGNAL
通信CH割り当て要求信号
61
キャリアセンス動作
CARRIER SENSING OPERATION
COMMUNICATION CH AND SLOT ASSIGNMENT
通信CH・スロット割り当て
62
CARRIER SENSING OPERATION
キャリアセンス動作
同期信号
SYNCHRONIZATION SIGNAL
63
SYNCHRONIZATION SIGNAL
同期信号
64
通信状態
COMMUNICATING CONDITION

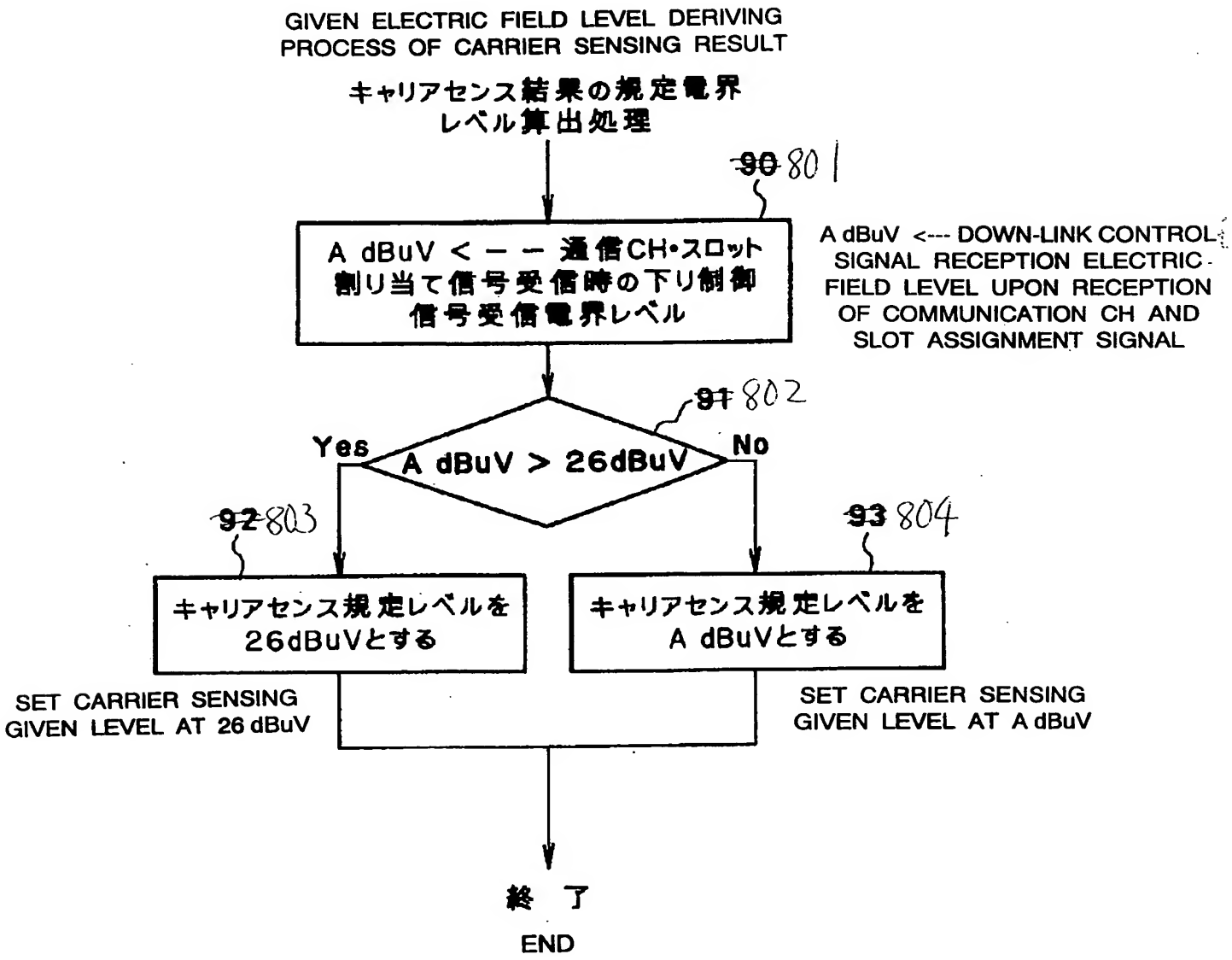
【図７】

FIG. 7


OFF-HOOK
オフフック
通信CH割り当て要求信号送出
701
TRANSMIT COMMUNCATION CH ASSIGNMENT DEMAND SIGNAL
702
通信CH・スロット割り当て要求信号受信
No
COMMUNICATION CH AND SLOT ASSIGNMENT DEMAND SIGNAL RECEIVED?
Yes
703
指定された通信CH・スロットの受信スロットと送信スロットのキャリアセンス
PERFORM CARRIER SENSING OF RECEPTION SLOT AND TRANSMISSION SLOT OF COMMUNICATION CH AND SLOT DESIGNATED
704
電界レベルが規定レベル以上か？
Yes
ELECTRIC FIELD LEVEL HIGHER THAN OR EQUAL TO GIVEN LEVEL?
No
705
通信CH割り当て要求信号送出
TRANSMIT COMMUNICATION CH ASSIGNMENT DEMAND SIGNAL
706
TRANSMIT SYNCHRONIZATION SIGNAL
同期信号送出
707
同期信号受信
No
SYNCHRONIZATION SIGNAL RECEIVED?
Yes

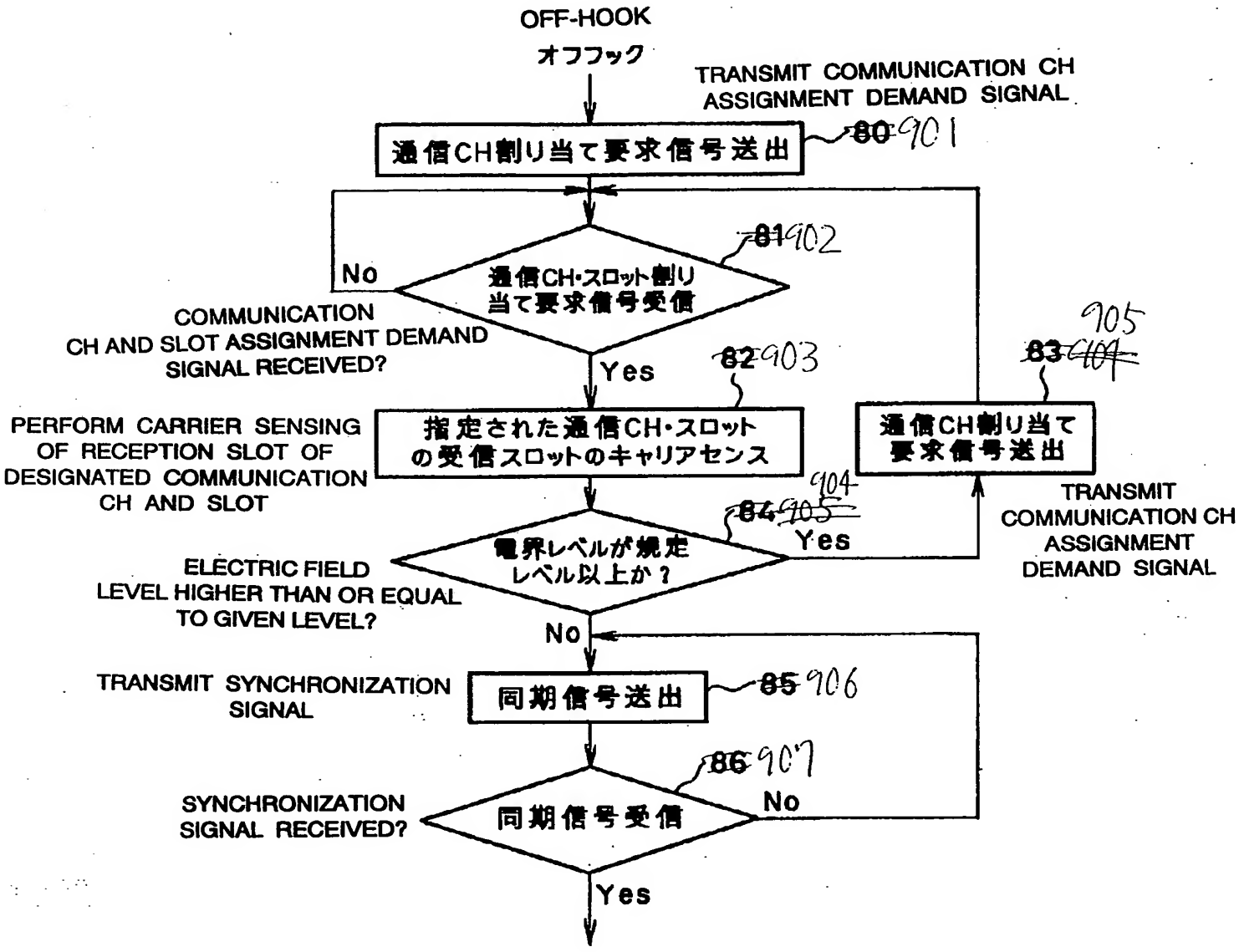
【図８】

FIG. 8


GIVEN ELECTRIC FIELD LEVEL DERIVING PROCESS OF CARRIER SENSING RESULT
キャリアセンス結果の規定電界レベル算出処理
90 801
A dBuV <－－－通信CH・スロット割り当て信号受信時の下り制御信号受信電界レベル
A dBuV <--- DOWN-LINK CONTROL SIGNAL RECEPTION ELECTRIC FIELD LEVEL UPON RECEPTION OF COMMUNICATION CH AND SLOT ASSIGNMENT SIGNAL
91 802
A dBuV > 26dBuV
Yes
No
92 803
キャリアセンス規定レベルを26dBuVとする
93 804
キャリアセンス規定レベルをA dBuVとする
SET CARRIER SENSING GIVEN LEVEL AT 26 dBuV
SET CARRIER SENSING GIVEN LEVEL AT A dBuV
終　了
END

【図９】

FIG. 9


OFF-HOOK
オフフック
TRANSMIT COMMUNICATION CH ASSIGNMENT DEMAND SIGNAL
通信CH割り当て要求信号送出
80 901
81 902
通信CH・スロット割り当て要求信号受信
No
COMMUNICATION CH AND SLOT ASSIGNMENT DEMAND SIGNAL RECEIVED?
Yes
82 903
PERFORM CARRIER SENSING OF RECEPTION SLOT OF DESIGNATED COMMUNICATION CH AND SLOT
指定された通信CH・スロットの受信スロットのキャリアセンス
84 905
電界レベルが規定レベル以上か？
ELECTRIC FIELD LEVEL HIGHER THAN OR EQUAL TO GIVEN LEVEL?
Yes
904
83 905
通信CH割り当て要求信号送出
TRANSMIT COMMUNICATION CH ASSIGNMENT DEMAND SIGNAL
No
TRANSMIT SYNCHRONIZATION SIGNAL
同期信号送出
85 906
86 907
同期信号受信
SYNCHRONIZATION SIGNAL RECEIVED?
No
Yes